PB-219 467

An Analysis of the Regulatory Aspects of Natural Gas Supply (Abridged Report)

Foster Associates, Inc.

prepared for

Enviromental Protection Agency

MARCH 1973

Distributed By:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE

APTD-1458

PB 219 467

AN ANALYSIS OF THE REGULATORY ASPECTS OF NATURAL GAS SUPPLY

(ABRIDGED REPORT)

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U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Water Programs
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

53

BIBLIOGRAPHIC DATA SHEET	1. Report No. APTD-1458	2.	3. Recipient's Accession No. PB-219 467
4. Title and Subtitle An Analysis of the Regulatory Aspects of Natural Gas Supply (Abridged Report)			5. Report Date March 1973 6.
7. Author(s) M. W. Rockefeller			8. Performing Organization Rept. No. --
9. Performing Organization Name and Address Foster Associates, Inc. 1101 Seventeeth Street, N.W. Washington, D.C. 20036			10. Project/Task/Work Unit No. 11. Contract/Grant No. 68-02-0640
12. Sponsoring Organization Name and Address EPA, Office of Air Quality Planning and Standards Strategies and Air Standards Division Research Triangle Park, North Carolina 27711			13. Type of Report & Period Covered Final Report 14.

15. Supplementary Notes

16. Abstracts

A study was conducted to review the current regulatory picture affecting the supply and distribution of natural gas and low sulfur fuel oil, to analyze possible changes in this regulatory picture, and to appraise alternate regulatory strategies which could bring about increased supplies of these clean-burning fuels. The results of the study are contained in two separate reports, one report for natural gas and the other for fuel oil. Also, abridged copies of the two comprehensive reports are provided.

17. Key Words and Document Analysis. 17a. Descriptors

Government
Law

17b. Identifiers/Open-Ended Terms

Air pollution
Natural gas

17c. COSATI Field/Group 5D

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Unlimited	UNCLASSIFIED	~~49~~ 53
	20. Security Class (This Page) UNCLASSIFIED	22. Price 4.50

FORM NTIS-35 (REV. 3-72)

USCOMM-DC 14952-P72

APTD-1458

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(ABRIDGED REPORT)

by

Foster Associates, Inc.
1101 Seventeenth Street, N.W.
Washington, D. C. 20036

Contract No. 68-02-0640

EPA Project Officer: Frank Collins

Prepared for

ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Water Programs
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March 1973

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Publication No. APTD-1458

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ABRIDGED REPORT

Foster Associates has undertaken a study for the Environmental Protection Agency to review the current regulatory picture affecting the supply and distribution of natural gas and low sulfur fuel oil, to analyze possible changes in this regulatory picture, and to appraise alternate regulatory strategies which could bring about increased supplies of these clean-burning fuels.

This abridged report deals only with the regulatory situation pertaining to the supply of gas.

For purposes of our analysis, we have generally treated natural gas in two broad categories: conventional supply from wellhead production within the contiguous Lower 48 States, and non-conventional sources of supply. The latter include gas from Alaska (primarily the North Slope), gas imports from Canada (by pipeline) and from overseas nations (by tanker), and synthetic gas reformed from liquid hydrocarbons or coal. These supplemental sources are for the most part in an incipient state of development but are likely to become increasingly more important in the years ahead. They raise, however, some regulatory considerations not present with respect to more conventional supplies.

I. CURRENT REGULATORY PICTURE AFFECTING NATURAL GAS SUPPLY[1/]

Conventional domestic production of natural gas is affected by various forms of state regulation, by leasing policies of the Interior Department, and most importantly by Federal Power Commission controls over gas transported and sold for resale in interstate commerce. Non-conventional sources of gas supply are also subject to FPC controls to a substantial degree (insofar as interstate commerce is involved). However, in addition, imports of gas involve the Departments of State and Defense; synthetic gas reformed from hydrocarbon liquids involves the Oil Import Administration and Oil Policy Committee to the extent the underlying feedstocks are imported oil or oil products subject to import restrictions; and coal gasification involves the Interior Department's Office of Coal Research.

Finally, the Price Commission has provided another tier of regulation which seems likely to be extended in some form beyond the present expiration date of April 30, 1973.

A. Background Information

Before describing the different regulatory authorities which affect the supply of gas, some background information may be helpful respecting the different types of supply and how they reach the consumer.

At present, gas sold in the United States comes either from domestic natural gas production or from imports. In 1973, still another

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1/ The contents of this Report are current as of December 15, 1972.

source -- synthetic gas -- is scheduled to arrive on the scene for the first time.

Domestic production of natural gas currently comprises about 96% of the nation's consumption. The gas is produced from many thousands of wells (accounting for the term "wellhead" production) in thousands of fields primarily in the Southwest states of Texas, Louisiana, Mississippi, New Mexico, Oklahoma, Kansas and Arkansas -- with smaller amounts of production in the Rocky Mountain states, the Appalachian states, California, Ohio and Michigan, and Alaska. Some gas is produced in association with oil, although approximately 70% of the production today is "non-associated" (not produced in conjunction with oil). Production activities are preceded by leasing of the land involved (from private owners, states or the Federal Government), exploration and drilling to determine the location of hydrocarbon deposits and by developmental drilling to determine the extent of deposits.

Once gas is produced at the well, it is typically gathered in small diameter lines for delivery and sale to long-distance pipeline companies or other buyers with lines extending into the field. Prior to delivery, the gas is usually processed to recover various by-products (such as light oils, natural gasoline, and other petroleum gases including ethane, propane and butane) and to remove any significant impurities.

Thereafter, gas is transported various distances by pipelines for sale to two principal types of customers: privately and municipally owned distributors which purchase the gas for resale, and companies which purchase the gas for direct consumption. The latter are primarily electric

power plants or industrial plants located along or near the pipeline route. Sales to distributors are made at the city gate, i.e., the point or points at which the long-distance pipeline connects with a local distribution system. From the city gate, gas is transmitted and sold by distributors to individual residential, commercial and industrial customers at the burner tip.

The degree to which domestically-produced gas is regulated depends on whether it is sold in intrastate or in interstate commerce for resale. Production sold in interstate markets is subject to regulation from the wellhead to the burner tip. The Federal Power Commission (FPC) exercises price control over sales at the wellhead to interstate pipelines and over sales by interstate pipelines to distributing companies for resale. Transportation of gas in interstate commerce is also regulated by the FPC. In consuming areas, nearly all states regulate the price and conditions of service by natural gas distributors to ultimate consumers.

Intrastate gas is not subject to FPC jurisdiction but to varying degrees of state regulation. However, FPC wellhead price regulation of production for interstate markets has a significant influence in major producing states on the relative proportions of supply sold for intrastate and for interstate consumption and on the price of intrastate gas.

In addition, domestic production -- whether consumed in interstate or intrastate markets -- is affected by certain other types of regulation, including state conservation laws and federal leasing policies. In the latter category, Department of Interior leasing of Outer Continental Shelf lands for oil and gas exploration and production has had and will

continue to have a significant impact on the supply of natural gas available for interstate markets.

Imports of natural gas, comprising about 4% of U.S. consumption in 1971, are obtained by pipeline chiefly from Canada and by tanker in liquefied form from overseas nations. The bulk of the gas imported by pipeline is further transported and sold in consuming markets in California, the Pacific Northwest States, and the Great Lakes region. Smaller volumes are also imported for consumption in Montana, New York state and Vermont.

Imports of liquefied natural gas (LNG) by tanker are made possible by the ability to convert natural gas from a gaseous to a liquid state through cooling it to a temperature of about 260°F. By this process, approximately 625 cubic feet of gas can be reduced to one cubic foot of liquid. However, the necessity to maintain such a low temperature to keep the gas in liquid form makes LNG tankers more costly than comparable-sized tankers for transporting oil.

LNG imports thus far -- all to East Coast ports -- have been small in volume. While shipments have been received on a spot tanker basis since 1968, the first two long-term projects (20 years or more) were approved only in 1972. With respect to the larger of these projects (involving the importation of one billion cubic feet per day), deliveries are not expected to begin until late 1975 at the very earliest because of the time required to construct the necessary liquefaction facilities abroad, LNG tankers, and terminal and regasification facilities in the United States.

The regulation of gas imports starts at the Canadian-U.S. border in the case of pipeline imports and at the ship's unloading facilities in the case of LNG imports. All imports require approval of the Federal Power Commission which, in turn, consults with the Departments of State and Defense regarding national security aspects. (Approval of the State and Defense Departments is also required for the construction and operation of any facilities at the border for importation or exportation of gas.) In addition, as in the case of domestically produced gas, the FPC controls the transportation and sale for resale of imported gas in interstate commerce,[1/] and local sales by distributors are subject to regulation by state bodies.

Synthetic gas (SNG) can be manufactured from liquid petroleum feedstocks and coal. Proposals for some 40 plants to manufacture SNG from liquid hydrocarbons have been announced in the past year and a half, with one or two due to commence operations in 1973. Moreover, at least three specific coal gasification projects have been announced. All of these projects contemplate a gaseous end-product of a quality suitable for introduction into pipeline transmission and local distribution systems.

The degree of regulation of SNG projects depends primarily on the source of the feedstock and whether the final gas product will be sold in interstate commerce. The projects announced to date contemplate the use, to a substantial extent, of imported liquids as feedstock. Imported feedstocks (with some exceptions) are controlled by the provisions of the Mandatory Oil Import Program (subject to the policy direction of the Oil

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1/ As indicated on page 20, the extent of FPC authority over LNG import projects is not yet clearly established.

Policy Committee and day-to-day management of the Office of Oil and Gas, Department of the Interior). SNG transported and sold in interstate commerce will be subject to FPC jurisdiction -- the breadth of which is unsettled at this time. In addition, SNG projects will be subject to a variety of state and local regulations, many concerned with environmental safeguards.

As the above description indicates, the regulation of gas supply in the United States depends on a number of factors -- including the source of the gas, whether or not it is transported and sold for resale in interstate commerce, and, in the case of synthetic gas, the source and type of underlying feedstock. Also, with respect to LNG and SNG, regulatory scope and policies are currently evolving both within the agencies concerned and the courts. With these qualifications, the major regulatory bodies and their functions for the three types of supply -- domestic production, imported gas, and synthetic gas -- are listed below.

Domestic Gas Production	
State conservation agencies	Leasing of state lands. Drilling and production practices.
Interior Department	Leasing of federal lands.
Federal Power Commission	Wellhead sales for resale in interstate commerce. Transportation in interstate commerce. Sales in interstate commerce for resale.
State public service commissions	Rates and terms of sales by distributors.
Imports	
Federal Power Commission	Rates and terms of imports. Transportation in interstate commerce. Sales in interstate commerce for resale.
State and Defense Departments	National security aspects of imports.
State public service commissions	Rates and terms of sales by distributors.
Synthetic Gas	
Oil Policy Committee) Interior Department)	Liquid feedstock imports.
Federal Power Commission	Transportation and sales of SNG in interstate commerce for resale.
State public service commissions	Rates and terms of sales by distributors.
Other state and local bodies	Zoning regulations.

B. State Regulation

Gas supply is affected by three basic types of state controls: conservation regulation (applicable in greater degree to oil, but also to gas), leasing of lands (again applicable to both oil and gas), and regulation of local sales. In general, none of these areas of regulation are deemed at this time to present any material barrier to the development of supply. However, the extent to which public opposition in coastal states is able to block leasing or drilling of potential petroleum-bearing lands on environmental grounds could prove to be a major exception.

Virtually all producing states exercise a variety of conservation regulations aimed primarily at preventing physical waste of oil and gas. Another purpose is to protect correlative rights of property owners. The regulations relate, among other things, to well completion techniques and equipment; spacing of wells; pooling of tracts; unitization of reservoirs and portions thereof; limitation of production to reasonable market demand; allocation of allowable production to pools and among wells in a pool; secondary recovery operations; and protection against land and water pollution as a result of oil and gas drilling and production.

State regulation of production through market demand prorationing has primarily affected the production of oil (although oil prorationing has little or no effect at this time because of the absence of excess producing capacity). Gas supply has also been affected to the extent gas is "associated," i.e., produced with oil. However, most gas production today is "nonassociated" and generally not subject to state production controls.

Producing states all have authority to lease state lands. In general, leases are awarded at public auction to parties offering the highest cash bonus, and provide for a fixed royalty to the state on all oil and gas produced. In general, a basic objective of the states in the past has been to lease lands in order to maximize revenues. In some states, royalties from production on state lands are a significant source of revenue. Except perhaps for local situations, there has been little pressure to restrict leasing and development of potential oil and gas lands. Recently, however, environmental considerations -- the threat of oil spills in particular -- have caused various state legislatures and/or

regulatory bodies to seek to halt or ban leasing and drilling activities on certain offshore lands.

In California, for example, there has been no further leasing and almost no drilling of state offshore lands since the major oil spill in the Santa Barbara Channel in early 1969.

On the East Coast, similar pressures are now building up against offshore leasing and drilling. For example, in New York, several bills were introduced in the State Legislature this past year to ban oil and gas well drilling in the Atlantic Ocean off Long Island and/or adopt other measures aimed at environmental protection of offshore lands. Two of these bills were passed by both houses of New York Legislature but subsequently vetoed by Governor Nelson Rockefeller. One bill would have prohibited the leasing of any offshore lands for oil or gas extraction within three miles of the New York coastline (or such other boundary as may be ultimately determined to be subject to state jurisdiction). In vetoing this bill, Governor Rockefeller stated that the nation's growing energy needs may make it desirable to permit drilling off New York shores at some future time, and that the State Commissioner of Environmental Conservation has adequate powers to insure that any such drilling will be consistent with the need to protect the state's marine sanctuaries and recreational areas.

All but three states regulate the local sales of natural gas within the state. This regulation extends both to rates and to various conditions of service. In this last connection state regulatory agencies have become increasingly involved during the past few years in actions designed to respond to existing or expected natural gas shortages. These

shortages have developed over wide areas of the nation due to inability of an increasing number of interstate pipeline suppliers to maintain existing levels of gas delivery to customers, coupled with the inability of nearly all interstate pipelines to expand deliveries to meet demand growth in market areas. For the most part, the state actions take the form of approving limitations on new and increased service by local distributors and, in the event of insufficient supply to meet existing gas requirements, priorities of service to govern curtailments. However, a number of states have also taken other measures both to conserve existing supplies of gas and/or to encourage expansion of gas supply. Such measures include orders banning promotional advertising; approval of higher rates to interruptible and large industrial customers; encouragement to use alternate fuels; efforts to augment domestic gas production by permitting distributors to invest in exploration and development; support for coal gasification and other R&D projects; directives to expand underground storage or other peak shaving facilities; participation in hearings and/or proceedings before the Federal Power Commission, other federal regulatory agencies and Congress; and requirement of periodic supply reports by natural gas companies within the state.

C. Interior Department: Leasing of Federal Lands

The authority of the Interior Department to lease federal lands derives from the Mineral Lands Leasing Act of 1920 (onshore lands) and the Outer Continental Shelf Lands Act of 1953 (offshore lands). The OCS Act provided for federal jurisdiction over the submerged lands lying seaward of those granted to the states pursuant to the Submerged Lands Act of

May 22, 1953 (which gave the coastal states jurisdiction over such lands to a distance of three miles from their coast lines into the Atlantic and Pacific Oceans and up to nine miles into the Gulf of Mexico if a state's historic boundary prior to joining the Union had been more than three miles from shore or if such a boundary had previously been approved by Congress). The boundaries of the federal and state segments of the OCS have been the subject of extensive litigation in the courts and, in several states, are still not precisely defined.

With respect to onshore lands, leases are granted both by competitive bidding and by a simultaneous filing system. In the latter case, with a number of applications for the same lease filed simultaneously, the right of priority is resolved by public drawing. However, when land is within the known geologic structure of a producing oil or gas field, it may be leased only by competitive bidding and in units of not more than 640 acres to the qualified applicant offering the highest lease bonus. Royalty payments are usually 12.5%.

Regarding offshore lands, all oil and gas leases are issued on a competitive bidding basis under the OCS Lands Act. The present system involves cash bonus bidding by sealed bids, plus payment of a fixed royalty (by law, not less than 12.5%). To date, all OCS leases have required a royalty rate of 16-2/3%. Since passage of the OCS Act, Interior's Bureau of Land Management has conducted 25 sales of offshore oil and gas leases, including 11 drainage sales (in proven areas) and 14 general sales (in unproven areas). The pattern of sales has been sporadic, with no general lease sales held in eight of the 19 years and one or two

general sales held in the remaining years. In the aggregate, the sales have netted the United States Government cash bonuses in excess of $5 billion. On an acreage basis, two-thirds of the lease sales have involved lands adjacent to Louisiana. Thus far, the only other states involved to any significant extent have been Texas and California.

A measure of the importance of the nation's offshore oil and gas development is the fact that, between 1958 and 1971, production from OCS lands rose from about 1% to over 12% of total U.S. production of both natural gas and crude oil and condensate. (Including state offshore lands, the respective proportions are about 18% and 16%.) Even more important is the fact that only about 1% of OCS lands, or 7.4 million acres out of a total of 682 million acres, has been leased to date by the Federal Government.

The Interior Department currently plans to hold 10 general lease sales in the Gulf of Mexico through 1975. This schedule has already been somewhat delayed because of opposition from environmental groups. However, with 20% of the nation's total potential gas reserves projected to underlie OCS lands (excluding Alaska), the leasing of these lands on a regular and accelerated basis is imperative in order to provide the producing industry with promising drillable prospects. There is also a need to proceed with leasing of Atlantic OCS lands and to resume leasing of Pacific OCS lands. Here, however, major roadblocks could be environmental considerations and federal-state jurisdictional disputes.

D. Federal Power Commission

The Federal Power Commission has extensive power to regulate the transportation and sale for resale of natural gas in interstate commerce. This power stems from the Natural Gas Act. Passed in 1938, the Natural Gas Act was thought at first to apply only to natural gas pipelines. However, in 1954, the Supreme Court considerably widened its scope to cover natural gas producers as well.

Pursuant to various sections of the Act, the FPC exercises rate, certificate and abandonment authority over sales, transportation and facilities constructed by natural gas companies for such purposes. The FPC also has jurisdiction over gas imports and exports, as well as broad power to issue rules considered necessary to carry out its functions under the Act.

1. Producer Regulation

Without question, the most difficult and controversial aspect of FPC regulation has been its regulation of producer sales of natural gas at the wellhead. Various regulatory methods have been attempted -- based for the most part on cost computations for individual producers or for groups of producers in particular producing areas of the nation. In terms of eliciting supply sufficient to meet demand, these attempts must be pronounced a failure. For well over a decade, the FPC virtually froze the price of gas at levels fixed according to criteria bearing little or no relationship to marketplace realities. The effect was twofold: to discourage investment by producers in gas exploration and production, while at the same time artificially inflating the demand for gas in relation to other fossil fuels.

The history of FPC wellhead regulation is complex but crucial to an appreciation of the present gas supply picture and the current pressures for amendment of the Natural Gas Act to remove or relax FPC control over producer prices. Considered in retrospect, this history is subject to criticism on several grounds. However, in all fairness, it must be remembered that the FPC was suddenly faced in 1954 with the unwanted task of regulating literally thousands of producers under a statute which seems clearly not to have been written with that regulation in mind. In addition, price policies developed by the Commission in the early 1960's were at least partly attributable to court decisions requiring it to "hold the line" on producer rates.

From 1961 to 1968, FPC producer regulation was dominated by proceedings to determine rates on an area basis and, pending completion of these proceedings, by the establishment of interim "in-line" rates to govern certification of new sales. Under the methods developed for arriving at "in-line" prices, the FPC succeeded for several years in restricting rates for initial sales either to or below certain guideline levels promulgated in 1960. Similarly, in the area rate cases, the FPC's first decision in 1965 fixed rates for sales in the Permian Basin area only slightly higher than the guidelines set at the beginning of the decade; its second decision in 1968 established rates for the South Louisiana area below the guidelines of 1960. The first decision was eventually upheld by the Supreme Court which gave considerable weight to the experimental aspect of the Permian Basin area case. The second decision was also judicially upheld, although with "serious misgivings" and the suggestion that the FPC modify its decision.

Since 1968, faced with mounting evidence of a developing gas supply shortage, the FPC's regulation of producers has increasingly shifted toward the adoption of remedial measures aimed at reversing the downward trends in gas supply and encouraging higher levels of exploration for gas. These measures have included decisions permitting higher area rate levels, exemption of small producers from nearly all regulatory requirements, encouraging pipelines to advance money to producers for exploration and development of new gas supplies and, more recently, permitting temporary sales at rates in excess of area ceilings to pipelines requiring emergency supplies to maintain present deliveries to their customers. Many of these actions, however, have been appealed to the courts, and their validity remains uncertain at this time.

The most recent, and perhaps most far-reaching, measure taken by the FPC in response to the growing shortage of domestic gas supply was its adoption last summer of a new optional procedure for certificating new gas sales by producers at rates in excess of area ceilings (Order No. 455, issued August 3, 1972). The new procedure, which is subject to several restrictions as to its use, essentially contemplates a one-time review of new gas sales contracts in an effort to reduce uncertainty respecting future rates. The FPC action was immediately appealed to the courts as tantamount to deregulation, and the outcome of this litigation is undoubtedly a year or more in the future.

2. Pipeline Regulation

Pipeline rates have been determined by the FPC from the outset by the traditional utility rate base method which involves calculation of a

total cost of service for a particular company during a specified test period and translation of that cost of service into jurisdictional rates through various cost allocation and rate design techniques. Unlike the situation regarding producer regulation, use of the cost of service approach for determining pipeline rates is widely accepted, although the computation of individual cost components and determination of the rate of return level are frequently heavily contested in pipeline rate proceedings. Yet, except for gas produced by a pipeline itself (or purchased by a pipeline from an affiliated producing company), these disputed costing matters have had little bearing on the overall availability of gas supply. In the case of pipeline-produced gas, the FPC recently decided to permit pipelines to include such gas in their cost of service at area rate levels rather than at estimated cost of production, at least with respect to gas produced from leases acquired by pipelines since October 1969. The object of the change was to encourage pipelines to increase their search for and production of natural gas.

In the realm of rate design -- i.e., how to assign overall cost of service to rates for different classes of sales -- the methods applied by the FPC over the years have undoubtedly contributed to the overall background underlying the present gas demand-supply picture. Specifically, the Commission adopted policies in the late 1950's and early 1960's which had the effect of shifting the burden of costs away from sales to industrial and boiler fuel customers. The end result was to greatly accelerate the industrial demand for gas. The FPC is now reconsidering its rate design precedents with a view toward discouraging the use of gas for large volume industrial and boiler fuel purposes.

The FPC also exercises certificate regulation over the construction and operation of pipeline facilities for new or expanded service. Construction proposals are appraised in terms of four basic criteria: existence of a market for the service proposed, adequacy of reserves to support the proposed service, economic feasibility of the project, and financeability. In many cases, these criteria are satisfied with little difficulty, and certificates are issued without opposition or hearing. In some cases, the FPC has delayed certification until the pipeline applicants have perfected their evidence with respect to markets and reserves. In other cases, however, problems have arisen, and major projects have been denied by the Commission. Reasons for denial, among others, have included lack of immediate need for the service proposed, the desirability of exploring less costly alternatives, unnecessary duplication of existing facilities, insufficient data to meet the FPC's certificate criteria, and adverse impact on the price of supplies in the field. Notwithstanding these denials, an essential fact to be kept in mind is that no area of this country within economic reach of a pipeline (with the possible exception of isolated communities) has gone without gas for lack of FPC approval to build pipeline facilities.

More recently, the FPC has asserted the authority to control curtailment of deliveries by pipeline companies -- a matter of increasing importance as more and more interstate lines are confronted with the prospect, or reality, of insufficient supply to meet contractual obligations. The basic problem for the FPC is to provide for a fair allocation of supplies among all customers of an interstate pipeline in times of gas shortage. However, since the FPC lacks authority over the rates of pipeline

sales to direct industrial customers, its authority to control allocation of supplies to such customers was challenged in the courts. The Commission claimed this authority by virtue of its jurisdiction over transportation of gas in interstate commerce. Without jurisdiction over all of a pipeline's sales, including sales to direct industrial customers, the FPC charged that serious inequities in gas distribution could occur -- with direct industrial customers demanding full contract service while homes, schools, hospitals and other "human needs" customers would suffer a cutback in service. The Supreme Court upheld the Commission's approach.

3. Exports and Imports

Exportation and importation of gas into the United States require FPC approval under Section 3 of the Act. At the present time, exports of gas from this country are relatively insignificant, amounting only to 30 billion cubic feet in 1971 (excluding some 50 billion cubic feet annually of LNG exported from Alaska to Japan), compared with imports of 932 billion cubic feet. Imported gas is derived from two principal sources: by overland pipeline chiefly from Canada, and by tanker in liquefied form from overseas nations. In addition, some LNG has been imported on a spot basis via tanker trailer from Canada. However, the volumes involved here are extremely small, and such shipments are not considered to constitute anything more than sporadic supplies available from time to time to meet peak day needs in certain localized markets (principally in New England).

With respect to Canadian gas, import authorization is not only required from the FPC but also export authorization from the Canadian National Energy Board. The NEB's policy is to approve for export only

those volumes which are deemed excess to the quantities required to meet the estimated level of Canadian consumption four years ahead for 25 years. Such excess volumes are designated as "current surplus" available for export. In November 1971, the NEB rejected three pending requests to export gas to the U.S. for lack of any surplus available for export. However, the NEB's current surplus calculation did not take into account reserves in Canadian frontier areas where estimates of potential reserves are relatively large and active exploration is underway at the present time. Without substantial new reserve additions in Canada, it appears highly unlikely -- given the NEB's current approach to determining exportable surplus -- that there will be any appreciable increase in U.S. imports of Canadian gas in the future.

FPC regulation of imported gas in liquefied form from overseas nations is presently in an unsettled state. An initial question concerns the extent of the Commission's jurisdiction in this area. A second question involves the standards to be applied in evaluating LNG projects, while a third issue concerns the terms on which the imported supply is to be made available to U.S. markets. In 1972, the Commission dealt with these questions for the first time in decisions approving two long-term import proposals. In at least one case, however, the Commission's conclusions have raised considerable uncertainty respecting the future of both imported LNG and other high cost non-conventional sources of gas supply.

A major uncertainty stems from a condition imposed by the FPC in the El Paso Algeria case -- involving the importation of 1 billion cubic feet per day of Algerian LNG by three major East Coast pipelines -- requiring

that the pipelines sell the supply after regasification on an incremental rate basis (i.e., at the full cost of the expensive supplement, rather than at a rate reflecting the "rolling-in" or averaging of all of the pipeline's supply costs). All three pipelines have appealed this requirement to the courts. The concern is that incremental prices will either preclude high-cost supplements from being fully marketed or else will result in overwhelming administrative problems and inequities. The issues are complex, and it is assumed that the FPC will give the matter further study before carrying the precedent further.

The difference between incremental rates and rolled-in rates depends on the pipeline involved, its sources and mix of gas, the size and cost of the incremental supply, and other factors. The El Paso Algeria case provides an illustration of the difference for the three East Coast pipelines involved: Columbia Gas Transmission Corp., Consolidated Gas Supply Corp., and Southern Natural Gas Co. Of the one billion cubic feet per day of LNG to be imported from Algeria, Columbia has contracted to purchase 300 million a day (representing an estimated 9% of its total gas supply in 1977), Consolidated will purchase 350 million daily (or 14% of its total supply in 1977) and Southern Natural will also purchase 350 million (or about 20% of its total supply in 1977). Estimated average costs of this supply rolled in with all other system supply at each pipeline's system gas (the point of entry of the LNG into the pipeline's mainline system) are: 48.9¢/Mcf for Columbia, 61.5¢/Mcf for Consolidated and 57.3¢/Mcf for Southern Natural. (These estimated costs are 2.9¢, 9.6¢ and 10.1¢ higher, respectively, than the estimated average costs for each

pipeline without the LNG supply.) By contrast, estimated incremental costs of the LNG at the same point are: 90.7¢/Mcf for Columbia, 99.5¢/Mcf for Consolidated, and 94.7¢/Mcf for Southern Natural. Thus, in the situation here, rates based on incremental costs would range from 37¢ to 42¢/Mcf higher than rolled-in rates. Many pipelines fear that rate differences of this magnitude -- if incremental rates are required -- would prevent them from mounting major supplemental gas supply projects to maintain (and, in some cases, augment) existing levels of gas service.

4. Synthetic Gas

FPC regulation of synthetic gas (SNG), alternatively called substitute natural gas or substitute pipeline gas, raises essentially the same issues as base load LNG importation. The chief questions include: the extent of FPC jurisdiction, the source and cost of the feedstock supply, the cost of the final gas product, and incremental versus rolled-in pricing of SNG sales by pipelines.

A sizeable number of SNG projects (some 40 or more) based on reforming of naphtha or lighter liquid hydrocarbons, or on refining of crude oil into naphtha (for subsequent gasification) and low sulfur residual fuel oil, have been announced in the past 18 months. Some of these are wholly intrastate and so may proceed without application to the FPC. Thus far, five proposals have been filed with the Commission, hearings have been held on three, and one has been authorized by the FPC. In addition, an application was filed in November 1972 in the FPC by El Paso Natural Gas Co. for

authority to construct facilities to connect synthetic gas to be produced by a coal gasification plant which El Paso proposes to build in northwestern New Mexico.

With respect to jurisdictional issues, a recent FPC Opinion disclaiming jurisdiction over reformer plant facilities and sale of synthetic gas -- but clarifying Commission jurisdiction over the transportation and sale for resale of such gas when mixed with natural gas in the lines of an interstate transmission company -- appears to have removed much of the uncertainty. This is an important holding for companies planning SNG projects from the standpoint of depth of evidence and procedures required to obtain FPC approval. Any simplification of this process will undoubtedly tend to facilitate SNG projects. In a broader sense, however, the Commission's disclaimer of jurisdiction over reformer facilities is not likely to significantly affect the volume of SNG supply entering interstate markets in view of the Commission's uncontroverted authority to deny or condition the transportation of SNG (when mixed with natural gas) and its sale for resale in interstate commerce.

In regard to feedstock, two of the five projects mentioned above contemplate use of both foreign and domestic naphtha, one contemplates use of only domestic naphtha at least initially, one is based on domestic liquids (unspecified as to type) and the fifth would rely on imported LPG from Canada. Those projects based on use of foreign naphtha require import authorization from the Oil Import Administration which, to date, has granted no licenses for the importation of naphtha for conversion to synthetic gas. Use of domestic naphtha avoids this problem, but it is

presently more expensive than foreign supplies and also is not generally available today for uses other than the manufacture of gasoline and military jet fuel. As to LPGs, any widespread use of domestic supplies for gasification purposes would cause a considerable upward price effect in various markets, including the petrochemical market which, in the United States, largely depends on natural gas liquids for feedstock purposes. Canadian LPGs are not subject to U.S. import quotas but are subject to Canadian export restrictions. In short, the question of feedstocks for SNG projects -- particularly those based on use of foreign liquids -- involves complex considerations which should be evaluated in the context of overall energy policy objectives.

Finally, assuming the precedent established in regard to LNG imports from El Paso Algeria, the FPC can be expected to require incremental pricing for SNG supplies. This could cause marketing difficulties.

E. Other Regulatory Controls

1. Departments of State, Defense and Commerce

The Departments of State and Defense both have an important voice in policy matters affecting the supply of petroleum in the United States. In the past, the activities of the two Departments have been directed largely to oil. However, in light of the probability of increasing imports of gas (and/or liquids as feedstock for the manufacture of gas), the degree of interfuel substitutability possible in many markets and the need for a coordinated interfuel approach to current energy questions,

both State and Defense seem likely to become increasingly involved in formulation of policies affecting the supply of gas in the future.

To date, the State and Defense Departments have been consistently asked by the FPC for their position concerning both pipeline imports from Canada and, more recently, LNG imports from Algeria and Libya.[1/] There has been no opposition by the State Department to any announced gas import project thus far. Nor has the Defense Department recommended denial of any gas import project, although it has expressed concern in some instances that individual pipelines and gas distribution companies not become overly dependent on imported LNG.

Similarly, the Commerce Department has not played a significant role in policies affecting gas supply in past years -- although, during 1972, it participated in trade negotiations with the Soviet Union involving, among other things, the possibility of joint ventures to bring Soviet gas in liquefied form to the U.S. by the end of this decade. The Secretary of Commerce, however, recently advised that an early agreement concerning any such venture was not imminent.

2. Office of Coal Research

The Office of Coal Research administers the Federal Government's coal gasification program. This program was accelerated during the latter half of 1971 following President Nixon's Clean Energy Message of June 4, 1971

1/ Under Executive Order No. 10485, the FPC is required to obtain the favorable recommendations of the Departments of State and Defense for the construction and operation of border facilities for the exportation and importation of gas.

calling for expedited development of coal gasification technology. Subsequently, OCR signed an agreement with the American Gas Association providing for joint government-industry funding of expanded research efforts to produce pipeline-quality synthetic gas from coal. The agreement contemplates joint funding of $30 million annually over a four-year period, two-thirds to be provided by the Federal Government and one-third by industry.

The current OCR gasification program includes four ongoing pilot plant projects. The pilot plant program is intended to aid the design of a demonstration plant to be built, largely through industry financing, within five or six years. It is hoped that operation of the demonstration plant will provide, by the end of the decade, a sound commercial basis for the construction and operation of large coal-based synthetic pipeline gas plants. OCR's target date for coal gasification on a commercial scale is 1980.

3. Price Commission

The Price Commission, established under Executive Order No. 11627 of October 15, 1971, was directed to prescribe specific standards, criteria and regulations to carry out the goals of the Cost of Living Council to stabilize prices and rents.

Sales of gas subject to regulation -- including wellhead sales under FPC jurisdiction -- are governed by Price Commission rules issued for regulated public utilities. These rules have undergone several revisions over the past year with respect to requirements for notifying the Price

Commission of requested rate increases and those approved by regulatory agencies, provisions for further review by the Price Commission of agency-authorized increases, and guidelines applicable to utility increases. Since its inception, however, the Price Commission has generally accepted the rulings of state and federal commissions in regard to rate increases for regulated companies. To date, no rate increase approved by the FPC for either gas pipeline companies or gas producers has been blocked by the Price Commission.

In sum, other than adding another tier of regulation, Price Commission controls have had little impact on the price of gas sold in interstate commerce for resale. However, with respect to intrastate gas sales which are not subject to FPC regulation, the Price Commission in several instances has denied rate increases because they exceeded base period prices or profit margins, or for failure to meet certain other criteria. The result has been the diversion of considerable quantities of intrastate gas, particularly in Louisiana and Texas, to interstate sales under FPC emergency procedures. These procedures permit producers to sell gas to interstate pipelines for short-term periods at prices higher than the area ceilings; in many instances, the prices allowed for these emergency sales exceed intrastate contract prices which are prohibited from rising because of Price Commission restrictions.

II. ALTERNATIVE REGULATORY STRATEGIES FOR INCREASING GAS SUPPLY

That the United States today faces a critical shortage of gas is undisputed. Seven interstate pipelines in the past year have been compelled to reduce deliveries to customers below firm contract levels, and 15 pipelines have predicted the necessity to curtail customers in the current winter season. Moreover, for most pipelines, there has been no supply available to permit new or expanded service for some time. Carried through to the retail level, gas distributors in many areas of the nation have been forced either to refuse or sharply restrict the attachment of new and increased loads. Industrial users of gas are being increasingly forced to seek out alternative fuels which are generally available, if at all, only at higher prices.

Another alarming indicator of supply is the steady decline in the nation's gas reserve inventory picture. For example, as contrasted with a 92% overall increase in production over the 1958-1971 period, total proved gas reserves in the Lower 48 States of the U.S. in 1971 were 2% below their 1958 level. More significantly, during the past four years when production rose more than 13%, total proved reserves dropped by some 40 trillion cubic feet (from 289.3 trillion cubic feet at the beginning of 1968 to 247.4 trillion at the end of 1971), or nearly 15%. This drop reflects the fact that reserve additions in the Lower 48 States averaged only about 50% of production over the 1968-1971 period. The worsening supply trends also reflect a steady decline in exploratory gas well drilling for more than a decade.

Still a further manifestation of the current gas shortage is the proliferation of projects announced in the past few years for the importation

of foreign LNG and development of synthetic gas supplies. In addition, many U.S. pipelines and distributors are contributing large sums to gas exploration efforts in frontier areas of Canada and Alaska as well as to feasibility studies of pipeline projects to bring such gas to U.S. markets. Increasing attention is also being given to coal gasification projects, with one such proposal already filed with the FPC and others under active consideration.[1/] All of these supplemental supply sources are projected to entail substantially higher unit costs of gas supply than domestic production. But the anomaly is that the bulk of the projects are an outgrowth of the decline in available domestic gas which, in turn, has been brought about to a considerable degree by inadequate prices for wellhead production.

This study suggests several possible regulatory strategies for increasing the supply of gas. Most of these strategies pertain to legislative action or FPC action to stimulate domestic production which, despite the publicity given to LNG, SNG and other such "glamor" sources of gas, will continue to provide the bulk of the nation's supply through at least this decade.[2/] At the same time, current projections indicate that domestic production will fall increasingly short of meeting demand in the years ahead. Therefore, it is also necessary to formulate regulatory policies

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1/ These projects are in addition to coal gasification research, jointly funded by industry and the Federal Government, aimed at development of a commercial process for converting coal to high-Btu pipeline quality gas by 1980.

2/ According to FPC Staff projections, production in the Lower 48 States will account for 94% of the estimated total U.S. gas supply (excluding Alaska) in 1975, 82% in 1980 and 71% in 1985.

at the earliest possible date to encourage development of supplemental gas projects meeting national interest and economic feasibility criteria. Even though gas imports and synthetic gas production will not be available in any important degree to augment domestic sources until the latter part of this decade or the early 1980's, the criteria and policies laid down in the next year or so will be instrumental in influencing future development.

It should also be noted that none of the more likely means for increasing gas supply will result in any substantial expansion of supply overnight. With respect to domestic gas, the results of any significant modifications of regulatory policy would take some time to perceive because of the time lag between exploration for new reserves and the date production commences to flow to markets. This lag is variously estimated at between three to seven years depending upon the producing area and distance from established market outlets. Nor, as indicated, do supplemental sources of gas supply offer much hope of supply alleviation for the immediate future. An exception could be the reforming of gas from naphtha and other light hydrocarbon feedstocks since reforming plants can be built within a period of two years or less. However, the bulk of naphtha feedstocks for such plants would have to be imported, thus raising questions concerning inter-fuel relationships and the direction of the nation's overall import policies in the years ahead.

A. Sanctity of Contract Legislation

One means of encouraging increased domestic production would be passage of legislation to assure contract sanctity, i.e., certainty of

price and other contract terms. So-called "sanctity of contract" bills were the subject of hearings before both House and Senate Committees in the last session of Congress, but were never reported out of those committees. These bills are not aimed at decontrol of producer prices. Rather, their purpose would be to immunize new producer contracts -- after a one-time review and approval by the FPC -- from subsequent regulatory change. The FPC review would extend to the entire pricing structure (initial price plus provisions for fixed escalations), the length of the contract and other contract terms. In passing on the contracts, the Commission would be prohibited from using the cost of service, public utility rate base method and instead would look to supply and demand factors, price levels deemed required to elicit adequate supplies for the interstate market, and economic and cost trends.

A major benefit of the sanctity of contract legislation would be the avoidance of the price confusion and risk which characterized FPC producer regulation in the 1960's. In South Louisiana, for example, the FPC rolled back price levels three times between 1960 and 1968. Such action was hardly inducive to producers to commit new reserves to the interstate market as opposed to the intrastate market where contract terms were binding. Another principal benefit would be to free the FPC from the cost of service ratemaking method. Although there are some (e.g., the American Public Gas Association and certain other consumer groups) who maintain that the cost of service approach is the only means of protecting consumers against unjust and unreasonable rates, it is our view that experience in the area rate proceedings over the past decade has shown application of the

cost method to producers on an area basis to present nearly as many difficulties as its application on an individual company basis. Significantly, in two recent area rate decisions, the FPC recognized that cost calculations cannot be mathematically precise, but rather reflect arbitrary judgments as to allocation procedures and a wide margin of error as to both data and methods used. (FPC Opinion No. 595 issued May 6, 1971 in the Texas Gulf Coast Area Proceeding; FPC Opinion No. 598 issued July 16, 1971 in the Southern Louisiana Area Rate Proceeding.) Relieved from any precedents or pressures to attempt to apply the cost method further for new gas supplies, the FPC could proceed to develop more rational regulatory standards giving greater recognition to market forces and the incentives necessary to elicit greater supply additions.

Generally speaking, there is little opposition to the concept of contract sanctity. However, various provisions of the proposed bills have been criticized on the ground that they go far beyond what is necessary to accomplish that goal. These criticisms reflect a fear of departing very far from the past regulatory scheme. However, it is now generally acknowledged that this past scheme was a factor which contributed in significant degree to the development of the present gas shortage.

B. Decontrol Legislation

Another regulatory strategy requiring Congressional action is decontrol of wellhead prices. This approach is urged by those who believe that sanctity of contract legislation would not go far enough in restoring the ability of gas prices in the field to react to market forces and hence in stimulating the needed turnaround in domestic supply.

Deregulation proposals take three general forms: decontrol of all gas, decontrol of gas under new contracts only, and decontrol of new gas contracts subject to certain safeguards.[1/] Decontrol of producer prices for new gas are known to be under active consideration by the Administration at this time. Support for legislation of this nature has been expressed by officials of the Interior, Commerce and State Departments; the Director of the Office of Emergency Preparedness; and the President's Council of Economic Advisers, among others. In addition, two current FPC members -- Pinkney Walker and Rush Moody -- favor immediate decontrol of domestic wellhead prices.

On the other hand, efforts to deregulate producers will probably be opposed by consumer and other interests as well. FPC Chairman Nassikas, for example, has come out against deregulation on the principal ground that the results would be chaotic in a time of supply shortage. He and others question whether producer markets are sufficiently competitive to permit adjustment to realistic price levels and whether, once gas price ceilings are removed, interfuel competition could provide any meaningful restraints on increasing gas prices. Another major question is the extent to which

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1/ In the last category, bills were introduced in the last two sessions of Congress by Senator Tower and Rep. Price (both of Texas) to eliminate FPC rate control over future contracts, provided that (a) the acreage involved had not previously been dedicated to the interstate market, (b) contract prices, including any escalations, are expressed in terms of a definite charge per unit, with indefinite price escalations prohibited, and (c) all other contractual provisions (such as quality, rate of take, prepayment arrangements, and abandonment of service), regardless of their effect upon contract prices, continue to be subject to Commission approval and review.

the price of gas would rise and the degree to which supply would respond if FPC wellhead regulation were eliminated.

Further, the reaction of Congress to any decontrol proposals is problematical at best.

Despite the uncertainties and reservations concerning the effects of decontrol, legislation in this direction would assuredly spur greater exploratory efforts and lead to increased gas supply additions. Should EPA desire to support the decontrol route, probably the type of proposal most likely of passage by Congress (and the one least disruptive to present consumer markets) would be legislation along the lines proposed by Senator Tower. In other words, deregulation would be limited to new gas contracts only, with safeguards to preserve some measure of FPC control.

C. Legislation to Expand Federal Regulation

Another general approach advocated by some to meet the current gas shortage is the expansion, not the reduction, of federal regulation. This approach includes proposals to establish national end-use controls on consumption of gas, together with extension of FPC jurisdiction over intrastate and direct sales in order to prevent unregulated markets from siphoning off new gas supplies for low priority uses.

Pressures for federal end-use controls over all gas markets reflect growing concern respecting the potential consequences of gas supply curtailments. If the present gas situation continues to deteriorate, some sort of controls may be needed to avoid curtailment of service to existing residential and commercial customers who have no feasible alternative to

the use of gas. However, determination of priorities for other classes of customers presents difficulties and especially so on a nationwide basis because of the considerable variation in patterns of gas usage in different regions of the country.[1/]

Above all, proposals for end-use control and/or intrastate sales regulation constitute measures for coping with the gas shortage, not for relieving it. On the other hand, if wellhead prices were permitted to rise to realistic market levels, purchasers of gas for interstate markets should again be able to compete with intrastate purchasers, and the tendency for newly available gas supplies to be committed to intrastate markets should diminish.

D. Modification of Producer Regulation

Leaving aside remedial legislation, the FPC can itself take regulatory actions designed to alleviate the gas shortage. In fact, it has already adopted several measures towards this end. However, there is a limit to how far the Commission can go within the present statutory scheme, and its actions are always subject to appeal and the possibility of court reversal.

A case in point is the FPC's recent adoption on August 3, 1972 of an optional procedure for certificating new gas sales, clearly its most innovative supply-inducement step to date. The new procedure is intended

1/ Even so, the FPC has recently acted to establish eight end-use priorities to be applied by all interstate pipelines in the nation during periods when insufficient gas supply necessitates curtailment of service (FPC Order No. 467, issued January 8, 1973). The FPC has also advanced a proposal to adopt the same priorities regarding usage of new gas supplies. (Docket No. R-467)

to provide two incentives to domestic production: authorization of sales of gas not prevously available to the interstate market at prices in excess of area rates (specifically, at prices "shown to be in the public interest"), and reduction of future rate uncertainty to the extent possible within the FPC's present statutory powers. The optional procedure -- contrary to some press reports and other pronouncements -- is not a decontrol measure. Not only must all contracts be submitted for FPC review and approval, but use of the procedure is also subject to several restrictions. Moreover, while the FPC proclaimed the intent to provide certainty of rates to the extent of its authority, it recognized that it cannot bind future Commissions not to modify those rates prospectively in the future. Nevertheless, the measure has been vehemently challenged by at least 15 Senators and 20 House members -- as well as certain consumer interest groups -- as a usurpation of the legislative function by seeking to effect, through administrative action, both contract sanctity and deregulation of new gas sales. A group of "Concerned Congressmen" and the American Public Gas Association immediately appealed the FPC's action to the courts. A final decision may be a year or more in the future.

The FPC apparently intends to rely to a considerable extent on the new optional certificate procedure as a vehicle for allowing higher prices. However, in the four months since its adoption, the optional procedure has not generated much response. To date, only four applications have been filed. While one of these applications was certificated relatively promptly, no protest was filed and the rate involved did not exceed the level already approved for sales in an adjacent producing area. The other three applications propose 45¢ rates -- nearly 20¢ higher than the

current area rate level -- for sales in South Louisiana. Various parties have petitioned in opposition, so that more protracted processing will be required.

Another course of action open to the FPC is to raise area rates -- either for new gas sales, or for both new and existing sales -- in order to give greater recognition to market value factors, including prices negotiated for intrastate sales, prices of competitive fuels, and cost and economic trends. This might be done through a reopening of the area proceedings, consideration of petitions to amend the area ceilings, or possibly through the establishment of some type of index permitting periodic price adjustments in accordance with changes in specific economic or cost indicators. However, adjustments within the present area pricing framework are not without drawbacks, and the FPC recently indicated reluctance to proceed in this direction.[1/]

1/ In Opinion No. 639 issued December 12, 1972, the Commission denied an unopposed petition to raise the new gas ceiling rate for Appalachian Area sales in the view that neither perpetuation of the present system of area pricing by contract vintage nor the initiation of a new round of area proceedings offered much hope for alleviating the natural gas shortage. Instead, the Commission urged wider use of the optional certificate procedure. The FPC also commented as follows to criticisms of the present area rate method on grounds of its failure to achieve a workable relationship between supply and demand and its dependence on the use of noncurrent cost data:

> "We appreciate that a uniform national rate for gas sold in interstate commerce, arrived at through rulemaking and tending toward recognition of the commodity value of gas, would not be subject to these infirmities, but before considering this course of action, as an alternative to area rate proceedings, we await the guidance of reviewing courts now hearing appeals of [three area rate decisions]." (Opinion No. 639, Mimeo, pp11-12.)

Given the present area rate system, an increase in rates for existing sales deserves serious consideration since net revenues from such sales provide an important source of cash for undertaking additional exploration and development. Some have opposed any price increases for presently flowing gas without assurance that the additional revenues will actually be devoted to a search for new gas supplies and not diverted to other types of investment. In certain recent decisions, the FPC has responded to this position by providing for increases in flowing gas rates only after specified commitments of new gas reserves to interstate pipelines. Alternatively, in one case, it granted an increase subject to the requirement that the resultant additional revenues be expended in an exploratory program over and above the normal level of expenditures for such activities.

Various other measures could be taken by the FPC to increase the supply of funds available for exploration and development. For example, in a few major cases in the past 18 months, the Commission has adopted a procedure under which refunds determined to be owing by producers to pipelines for excess charges in the past can be worked off by dedicating additional gas reserves to the interstate market. This procedure, or some other type of refund relief conditioned on further exploration, could be applied by the Commission in other cases as well. While waiver of refunds involves a number of equitable considerations, refund monies nevertheless are a potential source of supplemental funds to be directed to exploratory ventures holding promise for future supplies. Consumers could benefit far more by application of the funds in question to a search for additional gas reserves

than by receiving the refund monies either in cash or as a credit to their gas bill.

Still additional funds for gas exploration could be made available by extension and expansion of the FPC's program which permits pipelines to make advance payments to producers for development and production activities and to recover such advances in their rates. This program is presently scheduled to expire on December 31, 1972 but is now under review by the FPC with a view toward its extension and enlargement to include exploratory activities. Also, the Commission could provide encouragement to gas distributors -- as it has to small producers and pipelines -- to search for gas. Several large distributors have established exploration subsidiaries, and some have discovered reserves which they seek to have transported by an interstate pipeline to their service area. One case presenting this situation is now before the Commission.

E. Acceleration of Offshore Leasing

Clearly, one of the most obvious means for encouraging expansion of natural gas supply is to accelerate, and regularize, the leasing of lands on the Outer Continental Shelf. Offshore lands have been estimated by the U.S. Geological Survey to contain about 40% of total U.S. potential gas reserves (including Alaska), yet only about 1% of the federal offshore area has been leased to date. The Interior Department has recognized the need for accelerated leasing and is currently going forward with a plan to hold two general lease sales annually over a five-year period in the Gulf of Mexico. Some delay in this schedule has already occurred due to court

litigation over the adequacy of Interior's environmental impact statement. At a minimum, all possible efforts should be made to see that the 10 projected lease sales are conducted without further delay

Interior's current leasing plan has its principal focus in the Gulf of Mexico, which is reasonable since potential gas reserves in OCS lands off Louisiana and Texas are estimated together to comprise 152 trillion cubic feet, or well over 60% of the total offshore potential (excluding Alaska). Offshore Louisiana, in addition, is already a prolific producing area. However, it is imperative that efforts also go forward to enable leasing in the Atlantic and Pacific OCS areas, and in the Gulf of Alaska, at the earliest possible time. The Atlantic OCS -- estimated by the Potential Gas Committee to contain 36 trillion cubic feet of potential gas reserves -- is a nearby and geologically promising source of increased domestic supply for the East Coast, already heavily dependent on imports of foreign oil and likely to become also dependent on imports of foreign gas (LNG) in the future. Similarly, the Pacific OCS, with estimated potential gas reserves of some 11 trillion cubic feet, represents an obvious source of additional clean-burning fuel for West Coast states, especially California. Yet, leasing of either the Atlantic OCS, or further leasing of the Pacific OCS, can be expected to encounter substantial opposition on environmental grounds.

It is, of course, understood that OCS leasing should go forward only under stringent environmental safeguards. The danger of oil spills can never be entirely eliminated. However, regulations and enforcement of standards to prevent oil spills are stronger today than ever before

and also are under constant review to identify possible improvements. The efforts being taken by the Interior Department to require and enforce strict precautionary measures, and the fact that reasonably safe drilling operations can be conducted on offshore lands, need repeated emphasis to the public. The fact that the petroleum potential in the Atlantic OCS is deemed to be at least 30 miles from shore should also be stressed.[1/]

F. Encouragement of Supplemental Gas Supplies

The most likely sources of nonconventional gas on the horizon at this time for increasing U.S. supply over at least the next decade are: (1) gas from Alaska, primarily the North Slope;[2/] (2) gas imported by

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1/ While there is some question under international law as to the outer limit of the OCS area subject to U.S. jurisdiction, the 1958 Geneva Convention on the Continental Shelf clearly grants the U.S. sovereign rights to explore and exploit the natural resources of the Continental Shelf to a depth of 200 meters (about 656 feet). The width of the OCS at this depth varies widely in different offshore regions of the United States.

With respect to the Atlantic OCS, the U.S. Geological Survey has described the continental shelf as a submerged platform extending from mean low tide to the break marking the beginning of the continental rise -- with a width varying from less than three miles off southern Florida to about 285 miles off Newfoundland, and somewhat less than 600 feet in depth at most places. (Geological Survey Professional Paper No. 659, "Geologic Framework and Petroleum Potential of the Atlantic Coastal Plain and Continental Shelf," 1971.)

2/ Substantial gas potential is also believed to exist in the southern part of Alaska, primarily the Kenai Peninsula, where proved reserves were estimated at slightly more than 5 trillion cubic feet at the end of 1971. Gas from this area is now being liquefied and shipped to Japan. At least one West Coast distributor is considering the possibility of a project to bring LNG from the Kenai Peninsula to California.

pipeline from Canadian frontier areas;[1/] (3) LNG imported by tanker from overseas nations; (4) synthetic gas reformed from liquid hydrocarbons; and (5) synthetic gas from domestic coal. Other possibilities have also been mentioned -- such as nuclear fracturing of tight gas-bearing formations, oil shale gasification and tar sand gasification -- but these appear speculative for some years to come for technological reasons, among others.

Unlike wellhead production of domestic gas, the nonconventional supplemental sources involve a number of different facets of national policy. These considerations include national security questions concerning sources of supply, balance of payments problems, and oil import restrictions. In addition, nonconventional supply projects promise to be very costly to consumers -- certainly far more so than the cost of domestic gas now and probably still more so for the most part even with an increase in domestic gas rates to market clearing price levels. In short, the regulatory encouragement to be given to supplemental supply sources -- which ones, to what degree, and when -- requires a careful evaluation of a mix of interrelated factors.

From the standpoint of national security, coal gasification and Alaskan gas are the most advantageous. Assuming transportation of

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1/ Assuming continuation of present export policies of the Canadian National Energy Board (which requires retention of sufficient proved reserves in Canada to meet Canadian market requirements for approximately 30 years in the future before permitting exportation of gas), as exemplified by its recent denial of all pending export licenses for lack of exportable surplus, there seems little likelihood of any substantial increase in imports from Canada until sufficient reserves are developed in frontier regions to support new gas export projects.

Alaskan gas via Canada, various Canadian controls would be exercised, but, once gas was flowing, the danger of interruption of supply seems remote. The same observation pertains with respect to Canadian gas transported from such frontier areas as the Mackenzie Delta in the Northwest Territories, the Arctic Islands and eastern Canada offshore. As to importation of LNG from overseas, the bulk of the world's estimated gas reserves -- exclusive of North America -- are located in the Soviet Union, the Middle East and North Africa. Each of these area sources could be interrupted in the event of international political or military problems. While the consequences of such interruptions could be mitigated over time by achieving a maximum diversity of LNG sources, nevertheless, a cutoff of supply for any significant period could cause severe problems for particular pipelines or distributors which became heavily dependent on imported LNG.

Coal gasification presents little or no balance of payments problems, nor does Alaskan gas if transported by pipeline in Alaska and by tanker to the West Coast (assuming tanker construction in domestic shipyards). Some balance of payments considerations would be involved in the pipelining of Alaskan gas through Canada. Projects based on importation of gas (or LNG) or liquids for purposes of manufacturing gas raise greater problems in this regard. However, in the case of gas imports, these problems would be diminished to the extent that underlying foreign facilities utilized equipment and materials purchased in the United States.

Considered from a capital requirements standpoint, reformer gas projects based on naphtha feedstocks would appear to be the least costly

of the various alternatives at this time.[1/] For example, the Gas Arctic-Northwest Project under study to transport North Slope gas to the Manitoba-Minnesota border is currently estimated to cost $5 billion for a capacity of 3.5 billion cubic feet per day -- or more than $1.40 per cubic foot per day. The El Paso Algeria project to import 1 billion cubic feet per day is estimated to involve a total capital investment of over $1.6 billion (including facilities in Algeria, LNG tankers, and related regasification, storage and pipeline facilities in the U.S.) -- or about $1.60 per cubic foot per day. A coal gasification project recently submitted by El Paso to the FPC contemplates an even higher capital cost -- approximately $1.70 per cubic foot per day of capacity. By contrast, various gas reformer plant proposals filed with the FPC to date indicate a capital investment ranging between about 15¢ and 34¢ per cubic foot per day of capacity.

While the above comparisons are necessarily imprecise because of the tentativeness of many of the underlying cost estimates, they are nonetheless indicative of the vast amounts of capital required to bring about Arctic pipeline, coal gasification and major base-load LNG importation projects. Because of lower capital investment requirements, naphtha-based reformer projects could be implemented by more and by smaller companies to obtain base load or seasonal supplies. At the same time, it should be pointed out that such projects, in general, do not offer a

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1/ Such projects also offer the advantage of a shorter lead time than other supplemental sources of supply. Reformer plants using naphtha can be built in two years or less, as compared with roughly four years for large-scale LNG import and coal gasification projects and still longer for a project to connect North Slope gas.

cheaper source of gas to consumers in terms of cost per unit of supply. On the basis of the year-round projects announced to date, the estimated costs per unit of output range from 77¢ to $1.42/Mcf. For seasonal projects, unit costs are estimated in the range of $1.30 to $1.80/Mcf. The bulk of these costs is attributable to the cost of naphtha feedstock which, according to evidence submitted in the FPC, accounts for about 75% of the tailgate cost of reformer gas.

Aside from sensitivity to feedstock costs, a major disadvantage of naphtha-based reformer plants is their dependence on oil product imports. While some synthetic gas projects now under consideration contemplate use of domestic feedstock, most naphtha produced in domestic refineries today is consumed in the manufacture of gasoline and military jet fuels. Therefore, the naphtha reforming route would require substantial imports of a refined crude oil product to produce gas which would doubtless exceed the energy equivalent cost of crude oil. In addition, this route would result in increased reliance on foreign refining capacity.

An alternative and probably more desirable route is the importation of crude oil to produce naphtha in domestic refineries, for subsequent conversion to synthetic gas, and low sulfur residual fuel oil. Several proposals of this nature have been outlined. In general, lead times for such projects are estimated to be somewhat longer and capital costs higher than for projects based on gasification of naphtha or lighter liquid hydrocarbons. However, the advantages of this course of action, compared with the importation of naphtha, include (1) encouragement,

rather than discouragement, of domestic refining capacity; (2) procurement of two needed fuels rather than only one, with concomitant benefits of interfuel competition; and (3) the ability to use high sulfur crude oil as the basic refinery input.

The above discussion is intended to illustrate the myriad of policy issues which bear on supplemental supply projects. These issues must be resolved within a national policy context and cannot be viewed from the standpoint of gas supply maximization alone.

Still another issue has recently come into prominence with the FPC's decision last June approving the importation of 1 billion cubic feet per day of Algerian LNG by three major interstate pipelines serving the East Coast. This issue -- which affects not only imported LNG but also all other high-cost nonconventional supply supplements (and conceivably new high-cost domestic production as well) -- is whether such supplements should be sold at incremental prices (i.e., at the full cost of the incremental supply) or at rolled-in rates (i.e., at the average cost of all supplies).[1/] Traditionally, pipelines in the U.S. have followed the practice of rolled-in pricing. Over the years, this has resulted in efficient use of capacity, avoided complex problems of allocating particular supplies to particular customers and also avoided abrupt changes in prices

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1/ Actually, two levels of sales are involved. First are sales to customers -- distributors and direct industrial customers -- of pipeline companies proposing to import LNG or obtain other high-cost increments of supply. Second are sales by distributors to their customers, i.e., ultimate consumers. For the moment at least, the controversy has narrowed to the method of pricing by pipeline companies to distributor and direct customers.

for new supply acquisitions at higher costs. Continuation of this system, however, has now been placed in doubt by the FPC's decision requiring that the three pipeline importers of the Algerian LNG sell this supply only at incremental rates.

The basic rationale in favor of incremental pricing is that a new supply which cannot be sold at its full economic cost is economically infeasible. While this argument has appeal from a theoretical standpoint, it presents serious difficulties when considered in light of pipeline market realities today. Specifically, a consistent application of incremental pricing principles to all new gas supply sources costing in excess of the rolled-in average cost of a pipeline's existing systemwide supplies would create a host of administrative problems but, even more important, could limit and reduce the amount of new gas supplies for U.S. markets. This is because there are only limited markets at this time prepared to incur the risk of contracting for and then selling supplemental gas supplies at a multiple of historically prevailing gas prices. Thus, incremental pricing threatens the overall marketability of nonconventional gas supplements and thereby could be detrimental to EPA's pursuit of an enhanced supply of gas.

It might be argued that incremental pricing of new supplies would be justified under certain conditions and in certain situations in the future. However, the issue is complex and requires a thorough evaluation by the FPC of the nature of individual pipeline markets, whether supplemental gas is sought to maintain deliveries to existing markets or expand deliveries, alternative sources of supply, and load

balancing means.[1/]

G. Means of Influencing Regulatory Policy

Various options are open to EPA and other interested groups to seek to influence regulatory policy affecting gas supply. These include:

(1) Submission of statements to Congress on pending legislation pertaining to the regulation of gas and other fuels, as well as to energy research and other measures aimed at developing supplemental sources of gas and other fuels. For example, assuming the sanctity of contract bill which died in the last session of Congress is reactivated and legislation to deregulate wellhead prices in part or entirely is introduced, both measures would be obvious candidates for expression of views by groups concerned with gas supply.

(2) Statements of position to federal agencies (within the Executive Branch) considering certain actions. For example, statements might be made to the Interior Department regarding plans for further sales of offshore oil and gas leases; to the Oil Policy Committee on imports of both LNG and liquid petroleum feedstocks for SNG manufacture (a matter on which the OPC invited comments in December 1971); or to the Maritime Administration on various factors bearing on the grant of subsidies for construction of LNG tankers in U.S. shipyards.

(3) Statements of position to the Federal Power Commission on rulemaking proposals affecting the gas industry. In rulemaking proceedings,

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1/ No such evaluation was attempted in the one case where the incremental principle was adopted. In fact, no evidence was even submitted on the subject in that case.

formal intervention is not required. Any interested party may submit written comments (and comments orally, if a hearing is held).

(4) Intervention in Federal Power Commission adjudicatory proceedings having a significant impact on gas supply. (In independent regulatory agency proceedings of an adjudicatory as opposed to a rulemaking nature, formal intervention is generally required as a condition of participation.) For example, early cases dealing with applications for new gas sales under the optional certificate procedure will undoubtedly establish precedents regarding use of that procedure and thereby affect its efficacy in stimulating exploration and development of additional gas supplies. Other cases directed toward increasing area rates, use of refund monies owed by producers on exploration for additional gas supplies, or major new supplemental gas supply projects, might also warrant intervention. Such intervention, at a minimum, would permit statements of position setting forth reasons for or against the proposal in question. It would also permit presentation and cross-examination of evidence, if desired. This course might be particularly considered by a group with expertise bearing on some aspect of a proposal under consideration (such as, for example, the environmental consequences of coal gasification projects and related strip mining).

(5) Participation in state and local proceedings regarding leasing of offshore oil and gas lands, zoning changes to permit construction of LNG and SNG facilities, and other issues of this nature which have become increasingly prominent in recent years.